

HOGAN HIGH FREQUENCY APPARATUS INTERMEDIATE TYPE  
NO. 8085

DIRECTIONS FOR USE

TO ASSEMBLE The parts to be assembled consist of Cabinet, High Tension Transformer, (which is in sealed container), Condenser, (which is in the smaller sealed container), and the Secondary Oudin Resonator, which is a cylindrical device mounted on the top of the cabinet. Before proceeding to uncrate the cabinet, see that it is placed right side up because to remove any of the sides of the crate with the cabinet upside down is liable to release some of the braces, thus permitting the weight of the cabinet to rest upon the primary of the Oudin Resonator, mounted on the top of the cabinet.

On one side of the crate will be found several metal clamps. Take out the screw of each clamp which releases this side of the crate. The cabinet can now be withdrawn from the crate itself. To do this, take hold of the lower edge of the cabinet and carefully pull out. It is not necessary to loosen or take out any of the braces within the crate, as they are so arranged to be permanently fixed and yet sufficient to hold the cabinet in place.

The cabinet is polished before shipment to protect its surface during shipment. When received it should be carefully wiped off with a soft cloth. The High Tension Transformer will be found packed in a separate crate. Special care should be taken in uncrating the Transformer, so as to prevent injury to the rubber binding posts and high tension terminals. The condenser and other accessories will be found packed together in a large separate case. A blue print will be found pasted on the inner side of the cabinet door. This blue print is provided to show the wiring of the entire apparatus and to illustrate the principles of mechanism and construction.

HIGH TENSION TRANSFORMER This is immersed in a semi solid insulating medium and sealed in a non-magnetic container. On the top will be found mounted, two hard rubber posts. These posts support the high tension terminals of the secondary winding. On top and at the rear will be found nine small binding posts. These are the terminals of the primary winding of the Transformer. The correct position for the Transformer is in the bottom of the cabinet at the front, but with the nine small binding posts facing towards the rear door of the cabinet.

CONNECTION OF TRANSFORMER It will be seen that there are two metal rods suspended from the Spark Gap by flexible copper wires. Connect an end of each metal rod to the high tension terminals of the transformer. (See that all connections are securely fastened). The other ends of these rods are to be fastened to the two inside



binding posts on the condenser. Now connect up the wires leading from the switchboard on inside of cabinet, to each of the terminals of the transformer primary winding. Make certain that all nuts, washers and other connecting parts are free of oil and dirt. Poor connections mean poor efficiency.

TESTING & CARE OF TRANSFORMER Remove the small screw from center of hexagon plug (do not throw screw away) it may be needed sometime. The hole in hexagon plug acts as an air vent when the insulating medium in transformer expands from heat. Cleanliness of transformer top and tightness of connections should be examined at least once a month.

CONDENSER This is of the Franklin plate, oil-immersed type. It is placed on a stool on bottom of cabinet, in rear of transformer and directly below spark gap.

CONNECTIONS The two metal rods from High Tension Transformer are connected to the two center binding posts of condenser in conjunction with the two flexible copper wires leading from spark gap. The rods leading from the modality switch are connected to the outer binding posts of condenser. The thumb screw near hexagon plug is for the purpose of connecting a ground wire. It is imperative to complete this connection before operating the apparatus and can be done by running a wire to any convenient water pipe or other well-grounded fixture. Remove small screw from center of hexagon plug to allow air vent to function. (Retain screw).

MILLIAMETER This is shipped in the case containing other accessories. After unpacking the meter, you will notice that it is mounted on a metal arm, the end of which is fitted into the socket mounted on the front of cabinet, in the center and just above the terminal panel. After meter has been placed in the socket, move it around and make sure that it is working smoothly in any position desired.

THE SPARK GAP There are only two connections from the spark gap, and they should be connected to the sockets on the copper tubes that run from the High Tension Transformer over to the condenser. Fasten the two connections by means of the two set screws.

The spark gap, you will notice, is of the multiple type of eight gaps using sixteen Tungsten button contacts. All of the upper contacts are stationary and all of the lower ones are movable.

The proper way to start using the spark gap is to screw the master spark gap screw on the outside of the machine, in as far as it will go, and then, from the inside of the machine, turn all the lower contacts to the right, against their companion contacts and then unscrewing the master screw on the outside of the cabinet, out, thus bringing all the lower contacts back to their starting position.



When all is ready, turn the current into the machine and operate the spark gap by manipulating the master screw. All of the gaps will not open at one time, but when the master screw opens, the gap, probably one or two will open together, and then as the screw is gradually turned in, more of the gaps will open, until finally, when a very heavy current is in use, all of the gaps will be in operation. This operation is as it should be.

When a very small current is used and only one or two of the gaps are in operation, the machine is more apt to be in resonance.

The same gaps do not always come into play first. Sometimes it is the first and second, or fourth and sixth, or some other combination.

LOUDIN RESONATOR This cylindrical device is to be placed on top of the cabinet, inserting the screw and through central hole, observing that holes for ventilation purposes in cylinder coincide with those in cabinet. Fasten the cylinder in place with thumb screw attached to same.

CONNECTING IN CIRCUIT Before connecting up to the service line, compare all connections on the inside of cabinet, especially those you have made, with the connections as indicated on blue print, to see that all have been properly made. The blue print is correct.

CAPACITY The transformer has a capacity of 1 kilowatt, or about 10 amperes at 110 volts. Inasmuch as the apparatus is seldom run at full capacity, it is possible to connect it up to an ordinary lighting circuit, providing the circuit is not already overloaded. If such is the case, it is then advisable to install a special line to a fuse box.

During ordinary operation, the apparatus normally consumes less than 3 amperes, but for heavy dosages of Electro-coagulation and Diathermy, it sometimes draws 9 amperes or over; hence the line switch is provided with 20 ampere fuses. It is, therefore, also advisable to fuse the special line for 20 amperes.

#### TO OPERATE

Connect the apparatus to the service line, see that Condenser is grounded to an effective ground. This is very important and the ground connection should be to a water pipe that is in service or to some connection that positively leads to ground; using a hot radiator or other such like connection is strongly inadvisable. Before proceeding further, carefully read over the drawing of the cabinet and check up your procedure of operation with the designations marked on this drawing.

Now turn Modality Selector (C), to the modality desired, either



Oudin, Tesla or d'Arsonval; for the Oudin Current, turn the Selector handle firmly to your extreme right; you will feel it slide into place until it will go no further, thus indicating that contact is securely made.

For the Tesla current, turn the Selector handle so that the indicator is pointing to the center, at the same time you will feel that contact has been firmly made. The d'Arsonval current is obtained by turning the Selector handle to your extreme left, turning firmly until you can feel the switch connections come into good contact and as far as they will go.

Have Voltage Controller switch (E) on button No. 1; close the circuit by turning handle of line switch (C.S.) to the right, which is designated on name plate by the word "ON". Now slowly turn handle of spark gap regulator (D) to the right, until you feel that all slack has been taken up. Further turning from this point will gradually open up the spark gap. This will be indicated by the sound of hissing which is caused by the spark travelling between the edges of the spark gap plates.

If greater amounts of current are required, it is obtained by, firstly, advancing the Voltage Controller handle to button No. 2, at the same time turning the Spark Gap regulator handle to the right, which, of course, widens the gap. This procedure is indicated if more current is required, that is, move to button No. 3, 4, and so on, at the same time widening the Spark Gap. There is a point of maximum efficiency of Spark Gap operation with each tap of the primary voltage controller, that is, as the voltage controller handle is moved from button to button, the Spark Gap must be opened gradually at the same time to allow the current to flow. This point of efficiency is called "Resonance", and means that for each advance of the voltage controller the Spark Gap must be widened to take care of the increased amount of voltage. This condition of Resonance is indicated by a continuous steady hiss of the spark and also the steadiness of the Milliampere needle. If the Spark Gap is opened too wide the spark will be disrupted and roughened. This is indicated by a spluttering sound, and also a falling backwards of the Milliampere needle.

CONTROL OF CURRENT Control the current desired for treatment purposes by the Voltage Controller as near as possible, that is, do not use button No. 4 or 5 with the Spark Gap only partially open, because by so doing you are choking down the quantity of current being delivered to the spark gap.

You will get maximum results and the desired amount of current, and which also means perfect resonance, if, as you advance to each button, the Spark Gap is opened as far as will allow the current to flow smoothly without spluttering of the Spark Gap itself.

Of course, if in any treatment a very small amount of current



is desired, this can be adjusted by having the Voltage Controller at button No. 1, and regulating the amount of current by the width of the Spark Gap.

The voltage is stepped up by means of the High Frequency Transformer, from 110 volts to a minimum of 8,800 volts on the first button, to a maximum of 20,000 volts on the eighth button.

MILLIAMETER This is used to measure the milliamperage of any of the currents when carrying out Bi-Polar technique. If, through rough handling in transit, or after some usage, the needle does not stand at zero, it can be adjusted by means of a little screw head on glass face of meter, which, if turned to the right, will move the point of the needle towards the right, and vice-versa.

FOOT SWITCH Provision is made on operating panel when its use is required. By referring to the drawing and comparing the designation (F) you will find that it is in the form of a concealed socket. In this socket is placed a connecting plug. This plug should at all times be in the socket when the foot switch itself is not connected. On examination you will find that the plug is short circuited by a piece of copper wire. This is done to take care of the circuit and corresponds to the wiring of the foot switch circuit when connected. To connect foot switch, merely take out this plug and insert in its place the connecting plug, which is on the end of the cable leading from the foot switch.

The MacLagan insulated Foot Switch has a treadle with two pedals, one being marked (M) for momentary contact, and the other marked (C), for continuous contact. When using the foot switch, the "Line Switch" must be thrown to the right so as to close the line circuit, which will then pass through the Foot Switch, and current is then controlled by being turned on and off by means of the foot switch, as required.

When it is desired to apply treatments of some minutes duration, such as Diathermy, Auto-Condensation, etc., press the pedal marked (C), and this will close the foot switch for continuous contact. When such treatment is finished, press the pedal marked (M) which acts as a release and breaks the circuit. For brief applications, such as Electro-Coagulation, Fulguration, Desiccation, etc., press pedal marked (M) and hold down with foot as long as current is needed; by taking foot off pedal the circuit is automatically broken.

#### DETAILS OF CONNECTING MODALITIES IN CIRCUIT FOR TREATMENT PURPOSE

D'ARSONVAL CURRENTS These are obtained from the d'Arsonval Solenoid, which is located on the inside of the cabinet in front and near the top and is in the form of a nickel plated heavy wire of several convolutions. These currents are used when Diathermy, Auto-Condensation, Electro-Coagulation, Desiccation or Fulguration treatments are



instituted.

DIATHERMY This can be obtained in either heavy, mild or light degree.

HEAVY DIATHERMY A short cord will be found connected to the left binding post of Milliameter (M.1). Connect the free end of this cord to terminal No.1, on panel, and designated in drawing (J). Now take one of your long connecting cords and connect one end to right hand binding post of meter M.2). The other end of the cord is then connected to the electrode to be used on the patient. Take another cord and connect one end to terminal No. 3 on panel, and designated on drawing (H). Connect other end of this cord to the electrode to be used on patient. After electrodes are placed in proper position on patient, then proceed as instructed under heading "To Operate". (See that Modality Selector switch is turned to designation "D'Arsonval Solonoid").

MEDIUM DIATHERMY Connect free end of short cord from left binding post of meter (M1), to terminal No.2 on panel, designated on drawing (I). The connecting cord is now connected from right hand binding post of meter (M.2), to electrode to be used on patient, and the other cord is connected from terminal No.3 on panel, and designated on drawing (H), to other electrode to be used on patient. You are now ready "To Operate".

LIGHT DIATHERMY Connect free end of short cord from left binding post of meter, to terminal No.1, on panel, and designated on drawing (J). The cord is now connected from right hand binding post of meter (M.2) to electrode to be used on patient. The other cord is connected from terminal No.2, on panel, and designated on drawing (I), to other electrode to be used on patient. You are now ready "To Operate".

AUTO-CONDENSATION Connect free end of short cord from left binding post of meter (M. 1), to terminal No. 1, on panel, and designated on drawing (J). Now take a connecting cord and connect one end to right-hand binding post of meter (M.2). The other end is then connected to the Auto-Condensation pad or chair. One end of another connecting cord is then connected to terminal No. 3, on panel, and designated on drawing (H). The other end of this cord is then connected to the Auto-Condensation handle held by the patient. You are now ready "To Operate".

AUTO-CONDENSATION PAD This is of the folding type, so as to fit any ordinary office chair. It is also of sufficient width and length to be used on any treatment table, providing the table itself is not made of metal.

If desired, an auto-condensation chair may be used. On the back of the chair is a binding post which is connected with the condenser underneath the insulated back and seat of chair. The metal rod and binding post is to be slipped through the holes on the aluminum hand-



grips on chair arms, after the patient is seated in the chair. The object of this metal rod is to eliminate unnecessary wiring on the chair. It has been found by test that by eliminating the extra wires used on other makes of chairs and by substituting this metal rod, that an increase of 100 milliamperes in the current strength is obtained in a maximum treatment with the same setting of apparatus.

The introduction of the flat hand grips in place of the balls used on other chairs, has also made an increase in efficiency, as the patient's hands do not become cramped as they do when holding the balls tightly.

TESLA CURRENT This is obtained from the Tesla Coil, which is contained in the flat compartment, mounted on the inside of the front panel of the cabinet. There are three methods of application of the Tesla Current:

1. The Uni-Polar method, when using Vacuum electrodes or metal electrodes.
2. The "Indirect" method, when an auto-condensation pad or chair is used, through which the current passes to the patient, and the discharge taken by the operator.
3. The Bi-Polar method for Tesla-auto-condensation.

UNI-POLAR METHOD

Set modality selector on Tesla, and after patient has been suitably placed within working range of the cabinet, connect one end of a long connecting cord, to large center terminal, designated on drawing (K).

This terminal is called the High Potential Terminal of the Tesla Coil. If treatment with vacuum electrodes is being carried out, connect the other end of this cord to the vacuum electrode handle. If desiccation and fulguration treatments are being instituted, connect the end of this cord to the handle in which is fitted the needle or other metal electrode.

INDIRECT TESLA METHOD Set Modality Selector on Tesla, connect long connecting cord to large center terminal No.6, on panel designated on drawing (K). Now place your folding auto-condensation pad upon an office chair or treatment table, according to nature of case to be treated. Then place patient upon this pad, either seated or lying, according to case, as above stated.

Connect the other end of your connecting cord to the auto-condensation pad. Turn modality selector switch, as instructed in the Uni-Polar method. You are now ready "To Operate."

TESLA BI-POLAR ELIMINATION TREATMENT. (AUTO-CONDENSATION) Connect



your short cord from left meter binding post, designated on drawing (M. 1), to lower left-hand terminal, No. 4, on panel, and designated on drawing (L). After placing your auto-condensation pad on treatment table and lying patient thereupon, take a long connecting cord, one end of which is connected to right-hand meter terminal, designated on drawing (M.2). The other end of this cord is then connected to the auto-condensation pad.

It is advisable to place a pillow in position, so that your patient may rest the arms while holding the auto-condensation handle, and also to prevent undue arcing between body of patient and auto-condensation pad.

Take another connecting cord and connect one end of it to lower right terminal, No.5 on panel, designated on drawing (N). The other end of this cord is then connected to the auto-condensation handle, which is held by patient. Then proceed to operate.

If High-Voltage Tesla is desired, use posts four and six, and proceed as above.

TESLA DIATHERMY This form of treatment is recommended by some authorities in selected cases of high-blood pressure, with congestive headaches. Connections are made exactly as for auto-condensation, except that the end of the cords are connected to the metal electrodes employed, and which are placed in direct contact with the part under treatment.

DESICCATION WITH THE TESLA CURRENT Connections are made as for the "Indirect" method.

The operator may use his left hand as a rheostat to still further control the current, and any suitable sharp or blunt instrument may be used in the right hand of the operator, as the active electrode with which to draw the current to a point causing desiccation of the parts under treatment.

LOUDIN CURRENT This is obtained from the Loudin Resonator, which is mounted on the top of the cabinet, and is only used in the Uni-Polar method. Owing to the fact that this current is of extremely high voltage, practically no amperage, it therefore cannot be measured with the milliamperere.

The high-voltage current is induced from the primary winding, which is the heavy coil of wire within which stands the resonator, this resonator being termed the Secondary winding.

By referring to the drawing, you will notice several convolutions of nickel-plated heavy tubing; this is the "primary winding" of the Resonator. Mounted a little to one side, and in contact with one of the convolutions, you will notice what is known as a "tuning arm," designated on the drawing (B). Mounted within the "primary winding" is the Secondary winding or Resonator proper.



It is from the top of this Resonator that the current is taken. (designated on the drawing (A) ).

By the ordinary laws which govern dynamic electricity, the Resonator should give the highest voltage when the tuning arm, (see drawing (B)), is placed at the lowest convolution of the primary winding. However, there is a peculiar phenomenon known as "Resonance," which enters into this subject, and one can readily ascertain by moving tuning arm, and finding the particular point at which the tuning arm should be placed in order to obtain the greatest effleuve from the terminal on top of Resonator.

This current is so soft and painless that when it is sparking from the ball to a distance of several inches, you can advance your elbow to the discharge and receive the entire discharge, or grasp the auto-condensation handle or any metal instrument, and touch the ball and receive the entire spark with scarcely any sensation.

Owing to the extremely high voltage and frequency and low amperage, there is very little heating properties connected with it. Hence, the name "Cold Spark." When using the Resonator, the voltage controller can be advanced to the desired point and the spark gap regulated accordingly, and almost the entire output of the transformer may be used if desired.

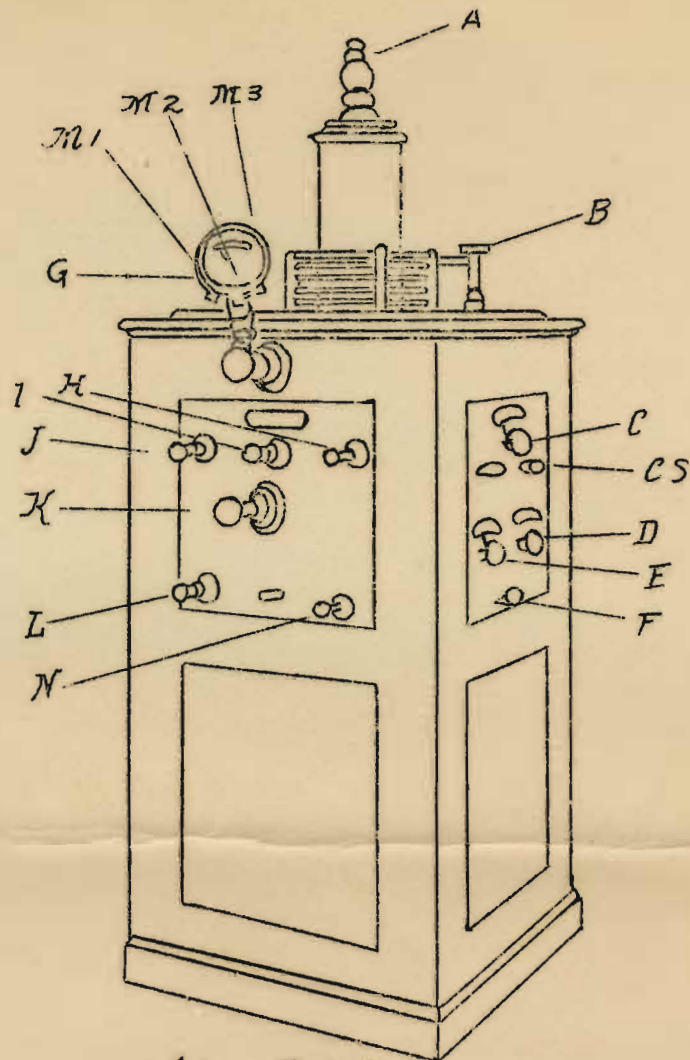
APPLICATION The Oudin Resonator affords a wide range of high frequency effects for Uni-Polar applications. A cord reel or a cord tip on one end and hook on the other, is attached to the topmost terminal of (A). To this is attached a suitable vacuum electrode, desiccation electrode or plain metal applicators, or the vacuum electrode handle with cord attached, may be employed with electrodes designed for use in the handle.

The very high voltage, intense discharges produced from the Oudin Resonator, are completely absorbed by the electrode, and patient, when proper connections are made. Even the very maximum output from this type of Resonator is very mild, except when desiccation technique is being employed.

This current is very effective in stimulating the skin and production of erythema, to relieve pain and promote superficial tissue drainage. It also produces ozone and oxides of nitrogen from decomposition of the atmosphere, and which possess germicidal action. It is indicated in Alopecia, Chronic Eczema, Acne and certain septic infections of sweat glands and hair follicles.

Glass electrodes should be kept in contact with the skin and current gradually turned on. More vigorous stimulation is obtained by occasionally lifting electrode for few seconds. Use strength of current as case indicates. Rapid stimulation over spine will increase blood pressure.





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|-------------------------------|----------------------------------|
| A. Oudin Resonator Terminal   | H. Terminal No. 3                |
| B. Oudin Resonator Tuning Arm | I. Terminal No. 2                |
| C. Modality Selector Switch   | J. Terminal No. 1                |
| C.S. Line Switch              | K. Tesla High Potential Terminal |
| D. Spark Gap Regulator        | L. " Low " "                     |
| E. Voltage Controller         | M.1. Milliammeter Binding Post   |
| F. Foot Switch Socket         | M.2. " " "                       |
| G. Milliammeter               | N. Tesla Binding Post            |